Combustion Appliance Safety Testing

You are required by FOCUS ON ENERGY® to complete a combustion appliance safety test where any air sealing or insulation work will be undertaken.

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CARBON MONOXIDE (CO)

Carbon monoxide is a toxic gas that is colorless, odorless, and tasteless. The gas is produced when insufficient combustion air is supplied to the appliance, the burner is improperly tuned, and/or the appliance is malfunctioning. Carbon monoxide can cause serious medical problems if it enters the home and is left undetected and untreated.

It is highly recommended that you monitor ambient CO levels continuously during the spillage test. Document the ambient CO levels (parts per million or ppm).

You should then take action as follows:

CO Level (ppm)	Action
0 to 8	No issue.
9 to 35	- Advise the homeowner/occupant of levels. - Recommend opening windows and doors. - Recommend that all possible sources of CO are checked. - When the source of CO is a permanently installed appliance, advise the homeowner/occupant to contact a qualified professional.
36 to 69	- Advise the homeowner/occupant of levels. - Open windows and doors. - Recommend that all possible sources of CO are turned off immediately. - When the source of CO is a permanently installed appliance, recommend that the appliance be turned off and advise homeowner/occupant to contact a qualified professional.
70+	- Terminate the inspection. - Notify the homeowner/occupant of the need for all building occupants to evacuate the building. - Leave the building and contact appropriate emergency services from outside the home.

Spillage Test

Spillage occurs when combustion gases do not exit the home through the chimney or b-vent. Spillage is caused by either a blockage in the vent or appliance (appliance spillage) or by negative pressure in the combustion zone drawing air down the chimney (mechanical spillage). It is important to do a combustion spillage test under natural conditions (appliance spillage) before starting work to ensure the appliance and vent/chimney are performing properly. After work is completed, perform the combustion spillage test under depressurized conditions (mechanical spillage) to confirm the combustion appliance will work under least-optimal conditions.

Pre-Insulation and Air Sealing Work

SETUP FOR CONDUCTING A COMBUSTION SPILLAGE TEST UNDER NATURAL CONDITIONS (APPLIANCE SPILLAGE)

Complete the following steps to test the combustion appliance(s) under natural conditions given the weather/temperature at the time of the test.

1. Put all chimney-vented combustion appliances located in this zone in their “off” or “standby” mode to prevent operation. (NOTE: Close fireplace dampers and any fireplace doors.)
2. Turn off any exhaust fans or heating, ventilation, and air conditioning (HVAC) fans.
3. Fire up the appliance and place in operation.
4. Assess spillage after two minutes of burner operation.
    a. Evaluate spillage using either a chemical smoke bottle or a mirror placed at the base of the draft diverter to determine if the combustion gases are spilling into the combustion zone or if the gases are drafting completely up into the appliance vent connector. Smoke should go up the vent pipe or chimney and the mirror should not show condensation.
5. Document the spillage test result on the Notification of Combustion and Mechanical Ventilation form (pass or fail).

TEST FOR SPILLAGE IF THERE IS A SECOND COMBUSTION APPLIANCE (LARGER BTU INPUT) CONNECTED TO THE CHIMNEY

1. Place this second combustion appliance in operation while the first appliance is still operating.
2. Re-test the first appliance for spillage after the second appliance has been operating for two minutes.
3. Test the second appliance for spillage immediately thereafter.
4. Document the spillage test results on the Notification of Combustion and Mechanical Ventilation form for each appliance.
    a. Appliance 1 (pass or fail).
    b. Appliance 2 (pass or fail).

IF SPILLAGE OCCURS

Do not proceed with insulation or air sealing work. A qualified professional should further evaluate or service appliance(s) to address the venting/appliance issues.

Post-Insulation and Air Sealing Work

SETUP FOR CONDUCTING A COMBUSTION SPILLAGE TEST UNDER DEPRESSURIZED CONDITIONS (MECHANICAL SPILLAGE)

Follow these steps to place the zone around the combustion appliance(s) under the greatest depressurization achievable given the weather/temperature conditions at the time of the test. This zone shall remain in this depressurized state during all spillage assessments.

1. Put all chimney-vented combustion appliances in this zone in “off” or “standby” mode to prevent operation. (NOTE: Close fireplace dampers and any fireplace doors.)
2. Close all building exterior doors and windows.
3. Close the interior doors of all rooms except for rooms with an exhaust fan and rooms with a central forced air return register.
4. Turn off any mechanical ventilation and forced air cooling or heating system blowers.
5. Turn on the following exhaust equipment:
    a. Clothes dryer(s) – First check/clean the dryer lint screen and be sure the exhaust damper is not blocked.
    b. Range hoods and all exhaust fans – If speed controlled, set to highest speed.
    c. Air handler blower equipment (heating and/or cooling system).

The area around the chimney-vented combustion appliance should be at its most depressurized condition.

6. Fire up the appliance and place in operation.
7. Assess spillage after two minutes of burner operation.
    a. Evaluate spillage using either a chemical smoke bottle or a mirror placed at the base of the draft diverter to determine if the combustion gases are spilling into the combustion zone or if the gases are drafting completely up into the appliance vent connector. Smoke should go up the vent pipe or chimney and the mirror should not show condensation.
8. Document the spillage test result on the Notification of Combustion and Mechanical Ventilation form (pass or fail).

TEST FOR SPILLAGE IF THERE IS A SECOND COMBUSTION APPLIANCE (LARGER BTU INPUT) CONNECTED TO THE CHIMNEY

1. Place this second combustion appliance in operation while the first appliance is still operating.
2. Re-test the first appliance for spillage after the second appliance has been operating for two minutes.
3. Test the second appliance for spillage immediately thereafter.
4. Document the spillage test results on the Notification of Combustion and Mechanical Ventilation form for each appliance:
    a. Appliance 1 (pass or fail).
    b. Appliance 2 (pass or fail).

IF SPILLAGE OCCURS

A qualified professional should conduct further evaluation/service to address venting/combustion air issues. Make sure the customer is aware of the door position and fan operation in the home so the HVAC/plumbing professional can recreate the issue.

NOTIFICATION OF COMBUSTION AND MECHANICAL VENTILATION

Combustion Safety

Combustion appliances produce exhaust gases that should be directly vented to the outdoors to prevent introducing combustion byproducts—like carbon monoxide and moisture—into the home.

Carbon monoxide is a toxic gas that is colorless, odorless, and tasteless. The gas is produced when insufficient combustion air is supplied to the appliance, the burner is improperly tuned, and/or the appliance is malfunctioning. Carbon monoxide can cause serious medical problems if it enters your home and is left undetected/untreated.

Maintain equipment per manufacturer's instructions.
Typical maintenance includes:

- Change furnace and ventilation equipment filters regularly.
- Clean your oven per manufacturer's instructions and have it serviced about every two years.
- Schedule annual tune-ups for your space heating and water heating equipment.
- Keep air intake and exhaust ports on the outside of your home free from obstructions.

Test carbon monoxide alarms regularly. Make a habit of testing detector batteries once a month. Units should be replaced every 3–5 years.

Combustion Safety

The following conditions were identified in your home. Combustion safety inspections and tests are performed to identify potential health and safety conditions that can be potentially life-threatening or hazardous.

Gas Leak

☐ Not tested / Not applicable ☐ None found ☐ Gas detector installed

☐ Found – Location: _____

Ambient Carbon Monoxide Levels

☐ Not tested / Not applicable ☐ 0–8 ppm ☐ 9–35 ppm ☐ 36–69 ppm

☐ 70+ ppm ☐ Carbon monoxide detector installed

Location: _____

Equipment Carbon Monoxide Levels

Furnace/Boiler

☐ Not tested / Not applicable ☐ Acceptable ☐ Unacceptable

Water Heater

☐ Not tested / Not applicable ☐ Acceptable ☐ Unacceptable

Stove

☐ Not tested / Not applicable ☐ Acceptable ☐ Unacceptable

Spillage

Furnace/Boiler

☐ Not tested / Not applicable ☐ None found ☐ Found

Water Heater

☐ Not tested / Not applicable ☐ None found ☐ Found

Notes / Comments:

Mechanical Ventilation

Inadequate ventilation reveals itself in several ways. Be on the lookout for lingering odors or musty smells, stale or stuffy air, condensation inside or outside of windows, excessive humidity, and mold or mildew.

Three easy ways to improve indoor air quality:

- **Spot ventilation:** Add a bath or kitchen fan near the moisture or pollution source.
- **Whole-house ventilation:** Use a bath fan or a fresh-air intake on the furnace along with a controller to provide fresh air.
- **Heat recovery or energy recovery ventilation:** Make whole-house ventilation a part of your heating system.

Things to watch out for when improving ventilation:

- Possible backdrafting of combustion appliances.
- Dangerous pollutants entering your home if air sealing between the home and attached garage is not addressed.

Mechanical Ventilation

In general, the program recommends that all homes have mechanical ventilation to help control indoor moisture and odors, and improve the quality of indoor air. Consider installing a ventilation system that meets the standard.

Mechanical Ventilation Requirements, CFM

Floor Area, sq. ft.	Bedrooms				
	1	2	3	4	5
<500	30	38	45	53	60
501–1,000	45	53	60	68	75
1,001–1,500	60	68	75	83	90
1,501–2,000	75	83	90	98	105
2,001–2,500	90	98	105	113	120
2,501–3,000	105	113	120	128	135
3,001–3,500	120	128	135	143	150

Ventilation

☐ Not tested ☐ Tested – Existing total CFM: _____

Notes / Comments:

Home Information

Customer Name:

Customer Address:

City:	State:	ZIP:

Signature

BY SIGNING BELOW, YOU ACKNOWLEDGE THAT YOU HAVE BEEN INFORMED OF COMBUSTION SAFETY AND VENTILATION RECOMMENDATION(S), AND YOU AGREE TO HOLD FOCUS ON ENERGY AND THE TRADE ALLY CONTRACTOR HARMLESS. FOCUS ON ENERGY EXPRESSLY DISCLAIMS ANY AND ALL WARRANTIES OR REPRESENTATIONS OF ANY KIND, WHETHER ORAL, STATUTORY, EXPRESSED, OR IMPLIED, INCLUDING WITHOUT LIMITATION WARRANTIES OF SUITABILITY OR FITNESS. THIS NOTICE DOES NOT CONSTITUTE AN ENDORSEMENT OR WARRANTY REGARDING THE PRESENCE OR ABSENCE OF OTHER REAL OR POTENTIAL HEALTH AND SAFETY HAZARDS THAT MAY EXIST AT THIS ADDRESS OR ON THE PREMISES.

Customer Signature:	Date:

Rebates are subject to change and cannot exceed project costs.

REDUCING ENERGY WASTE ACROSS WISCONSIN

Focus on Energy, Wisconsin utilities' statewide program for energy efficiency and renewable energy, helps eligible residents and businesses save energy and money while protecting the environment. Focus on Energy information, resources, and financial incentives help to implement energy efficiency and renewable energy projects that otherwise would not be completed.

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